

NRR-PMDAPEm Resource

From: Kim, James
Sent: Wednesday, September 17, 2014 8:47 AM
To: Couture III, Philip
Subject: 2nd RAI from Radiation Protection Branch - Eliminate Certain ESF Eequirements During Fuel Movement (TAC No. MF3068)

Mr. Couture,

The Nuclear Regulatory Commission staff is reviewing the submittal and has determined that additional information is needed to complete its review. The specific request for additional information (RAI) questions are shown below.

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REQUEST FOR ADDITIONAL INFORMATION
FOR A LICENSE AMENDMENT REQUEST TO ELIMINATE
OPERABILITY REQUIREMENTS FOR SECONDARY CONTAINMENT WHEN HANDLING
SUFFICIENTLY IRRADIATED FUEL AND WHILE PERFORMING CORE ALTERATIONS
ENTERGY NUCLEAR OPERATIONS
VERMONT YANKEE NUCLEAR POWER STATION
DOCKET NOS. 50-271

By application dated November 14, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML13323A518), Entergy Nuclear Operations submitted a license amendment for Vermont Yankee (VY). The proposed license amendment request (LAR) would eliminate operability requirements for secondary containment when handling sufficiently decayed irradiated fuel and while performing core alterations using Technical Specification Task Force (TSTF) – 51, “Revise Containment Requirements During Handling Irradiated Fuel and Core Alterations.” The Radiation Protection and Consequence Branch (ARCB) completed the review and safety evaluation input for the above LAR on July, 24, 2014. Subsequently, ARCB became aware of VY’s response dated August 6, 2014 (ADAMS Accession No.: ML14224A012) to a Nuclear Regulatory Commission staff request for additional information. The ARCB staff reviewed the supplement letter and needs additional clarification to write a safety evaluation.

ARCB2-RAI-1

In Supplement 2, dated August 6, 2014 (ADAMS Accession Number ML14224A012) VY’s response to SCVB-RAI-2 states:

It is noted that maintaining the Spent Fuel Pool (SFP) level of 36 feet 10 inches during fuel movement does not ensure that 23 feet of water is maintained above a postulated dropped and damaged fuel

assembly within the SFP (36 feet 10 inches corresponds to the SFP low level alarm). However, as discussed below, the radiological consequences of a Fuel Handling Accident (FHA) in the SFP are considered to be bounded by the design basis FHA over the reactor core. During normal plant operations, water level is maintained 23 feet above the top of the active fuel in the SFP storage racks.

Having the reactor cavity flooded during refueling operations ensures that 23 feet of water is maintained over the fuel in the reactor core, given that the existing VY design basis FHA (Calculation VYC-2299, Radiological AST Fuel Handling Accident) is based on the drop of a fuel assembly onto the core. The design basis FHA also considers a FHA 24 hours after shutdown. The analysis utilized damaged rods from drop heights of 34 feet utilizing the General Electric Standard Application for Reactor Fuel, GESTAR II method and 30 feet based on the maximum height allowed by VY refueling equipment. A fuel assembly drop height of 34 feet was used in conjunction with a decontamination factor of 200 (associated with 23 feet of water above damaged fuel). The FHA analysis of record is based on a fuel assembly drop of 34 feet onto the core, 24 hours after shutdown. This is considered to be bounding compared to a drop of significantly less height of a fuel assembly over the spent fuel pool. The license amendment request (Reference 1) and accompanying analysis to allow fuel moves with an open containment with a period of sufficient radioactive decay (fuel moves at 13 days) is considered to be bounded by the existing analysis of record (fuel moves at 24 hours).

Existing technical specification Limiting Condition for Operation (LCO) 3.2, "Spent Fuel Storage," states:

Whenever irradiated fuel is stored in the fuel storage pool the pool water level shall be maintained at a level of at least 36 feet.

At the minimum technical specification LCO 3.2 level of 36 feet what is the amount of water in feet maintained above a postulated dropped and damaged fuel assembly within the SPF?

ARCB2-RAI-2

Attachment 1, page 1 of 17 of LAR states:

A revised fuel handling accident (FHA) (or refueling accident) analysis has been developed to support the proposed changes using the Alternate Source Term (AST) methodology described in Regulatory Guide 1.183 (Reference 2). Attachment 4 provides the supporting calculation for the revised FHA analysis (See AREVA Document No. 32-9145461-001, "VYNPP – Re-analysis of AST/FHA Radiological Consequences with Open Containment," ADAMS Accession No. ML13323A519).

Appendix B of Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" (ADAMS Accession Number ML003716792), Regulatory Position 2.0 states:

If the depth of water above the damaged fuel is 23 feet or greater, the decontamination factors for the elemental and organic species are 500 and 1, respectively, giving an overall effective decontamination factor of 200 (i.e., 99.5 percent of the total iodine released from the damaged rods is retained by the water). This difference in decontamination factors for elemental (99.85 percent) and organic iodine (0.15 percent) species results in the iodine above the water being composed of 57 percent elemental and 43 percent organic species. If the depth of water is not 23 feet, the decontamination factor will have to be determined on a case-by-case method (Ref. B-1).

In the response to SCVB-RAI-2 above, VY stated that maintaining the SFP level of 36 feet 10 inches during fuel movement does not ensure that 23 feet of water is maintained above a postulated dropped and damaged fuel assembly within the SFP, but VY's analysis assumed a decontamination factor of 200 which correlates to 23 feet of water.

In VY's response to SCVB-RAI-2, VY provided reasons why this is acceptable. The Nuclear Regulatory Commission staff's assessment of these reasons identified the following concerns. VY's statement that the

license amendment request is considered to be bounded by the existing analysis of record does not appear to be consistent with the analyses provided by VY for the proposed change. The calculation of record doses (24 hour decay) provided in Table 5-2 on page 20 of AREVA Document No. 32-9145461-001 do not appear to bound the Table 5-3 values at 13 days. Secondly, the proposed change is not going to be utilized until all the fuel is removed from the reactor vessel; therefore, a FHA over the spent fuel pool was not evaluated by the staff for the proposed change. Lastly, no quantitative data was provided for the decontamination factor for the minimum technical specification SFP water level or the amount of fuel damage from a FHA in the SFP.

Therefore, the NRC staff needs additional justification for the proposed change. Please provide an analysis for the FHA in the SFP to justify the proposed change or justify why the analysis provided is appropriate. In either the analysis or the justification the fact that the technical specification water level is less than 23 feet needs to be considered in the response and the above NRC concerns should be addressed.

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